

The background of the slide features a close-up, high-speed photograph of water splashing, creating concentric ripples. On the left side, there is a vertical strip showing water being poured into a clear glass, with bubbles and a dynamic splash visible. The overall color palette is dominated by various shades of blue and white, giving it a clean, aquatic feel.

Drinking Water Wells & Septics

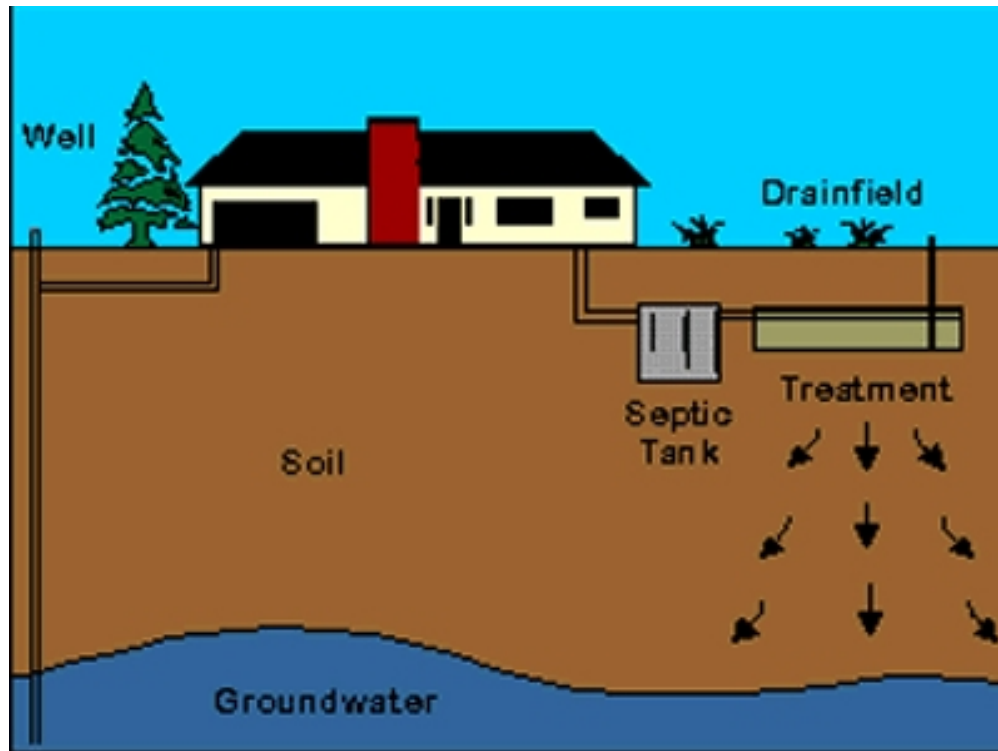
**Joe Meek, Montana Dept of Environmental Quality
(406) 444-4806**



What we'll cover:

- **Introductions**
- **How the water samples handled**
- **Why do these workshops**
- **When to ask questions**
- **Handout materials**
- **Water Wells**
- **Septic Systems**

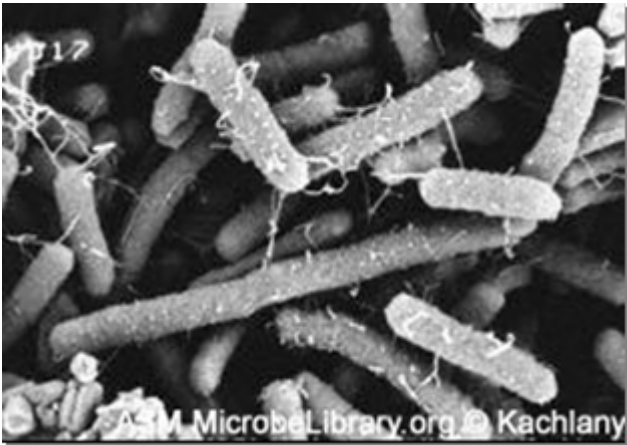
Main Point –Septic Systems Recharge Aquifers



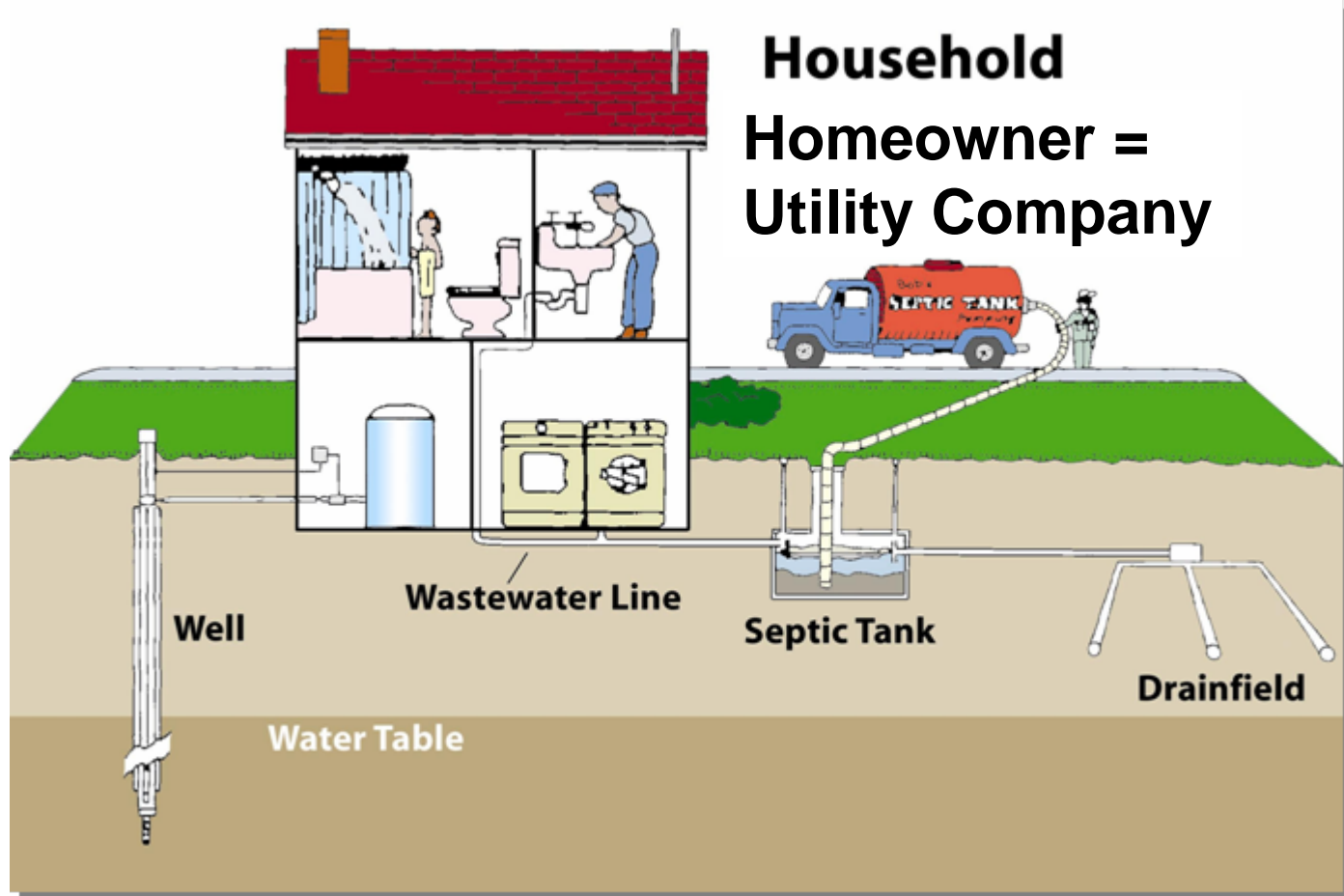
Main Point – Wells Need Maintenance



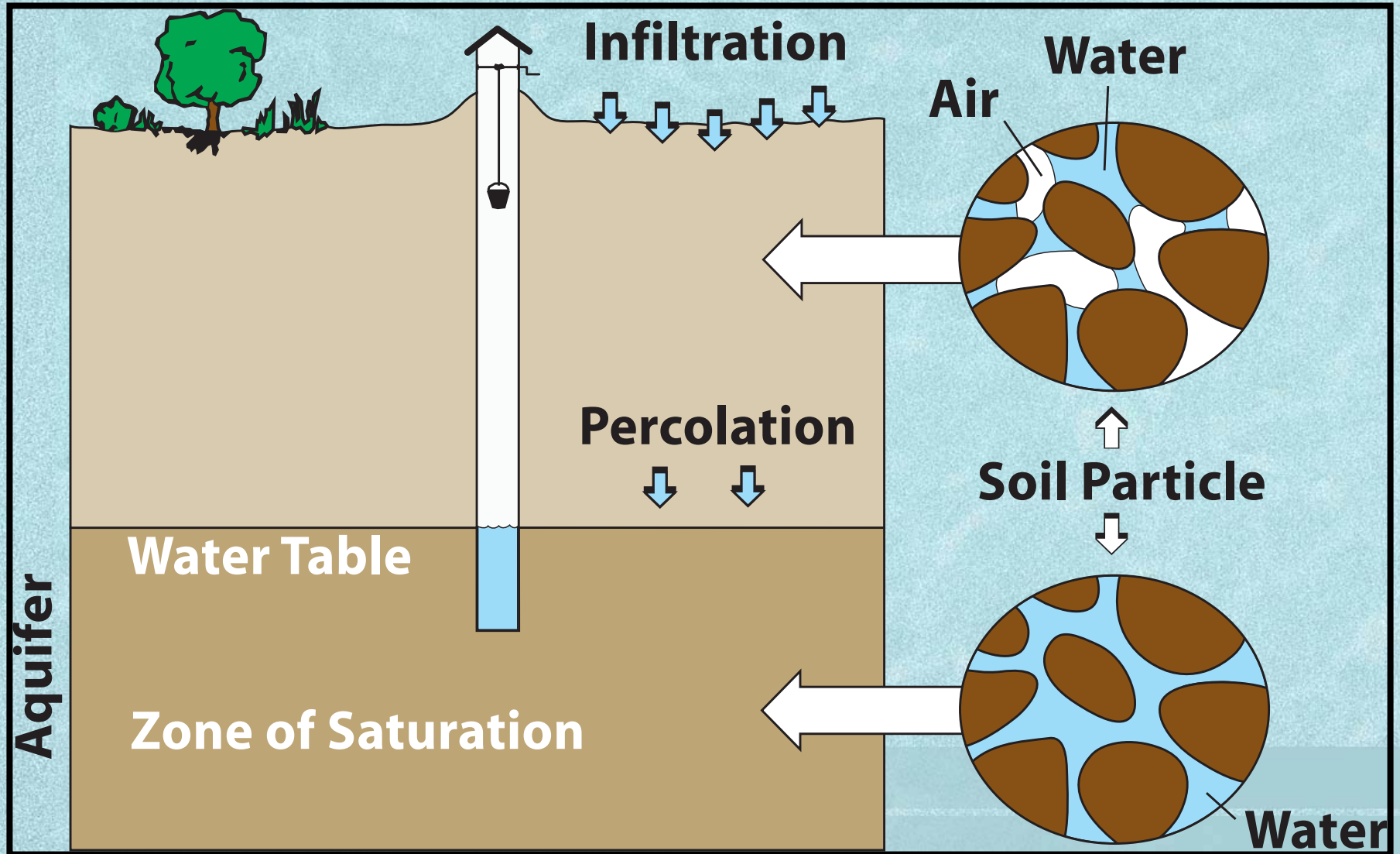
Main Point –Water Quality Monitoring Protects Health



Main Point – You are a Utility Company

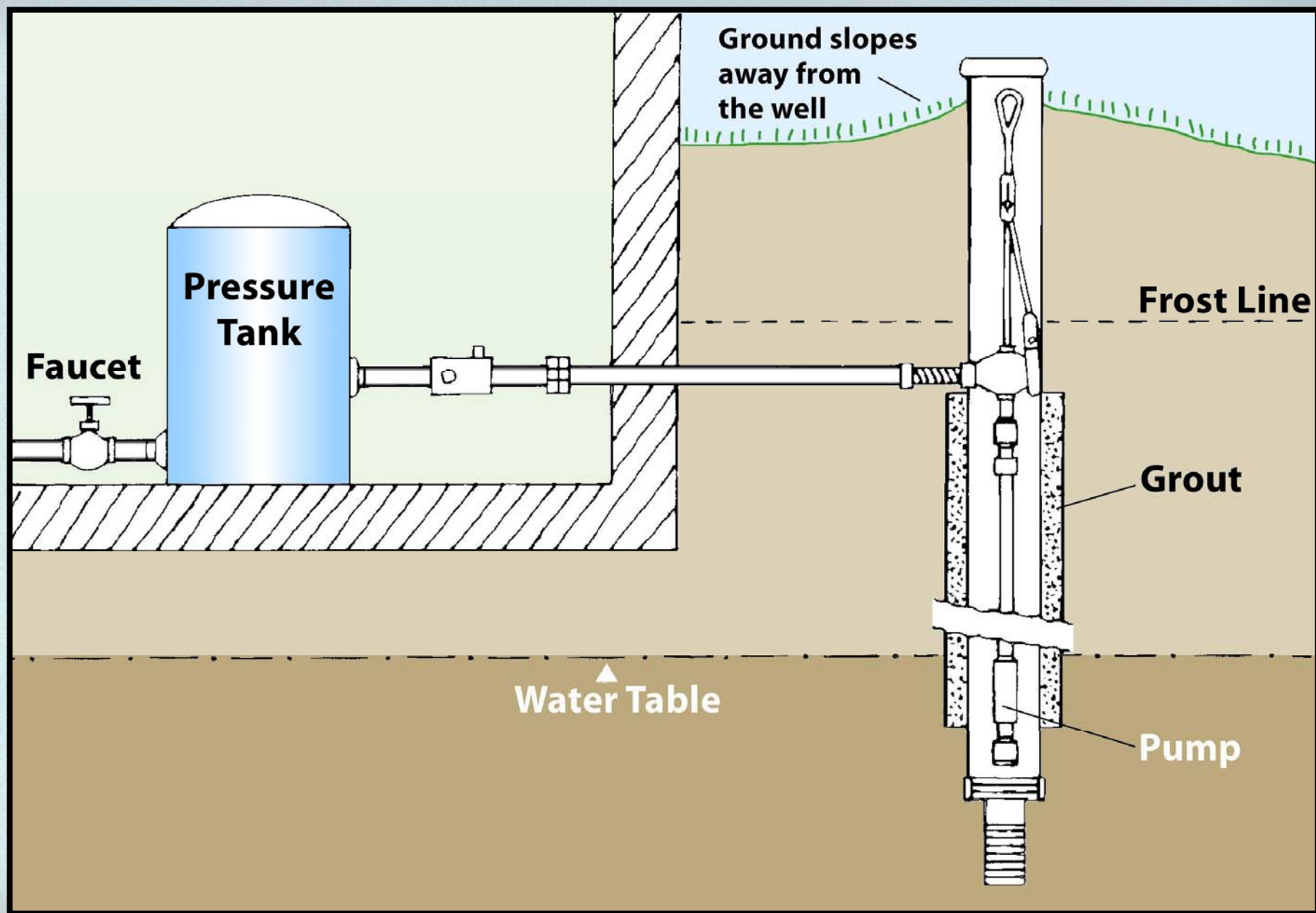


What is a Well? Aquifer?



Typical Well System Parts

- Well
- Supply line to house
- Pressure control and gauge
- Control box (three wire pumps)
- Pressure tank
- Gate or shut off valve
- Drain valve
- House plumbing



Typical household system

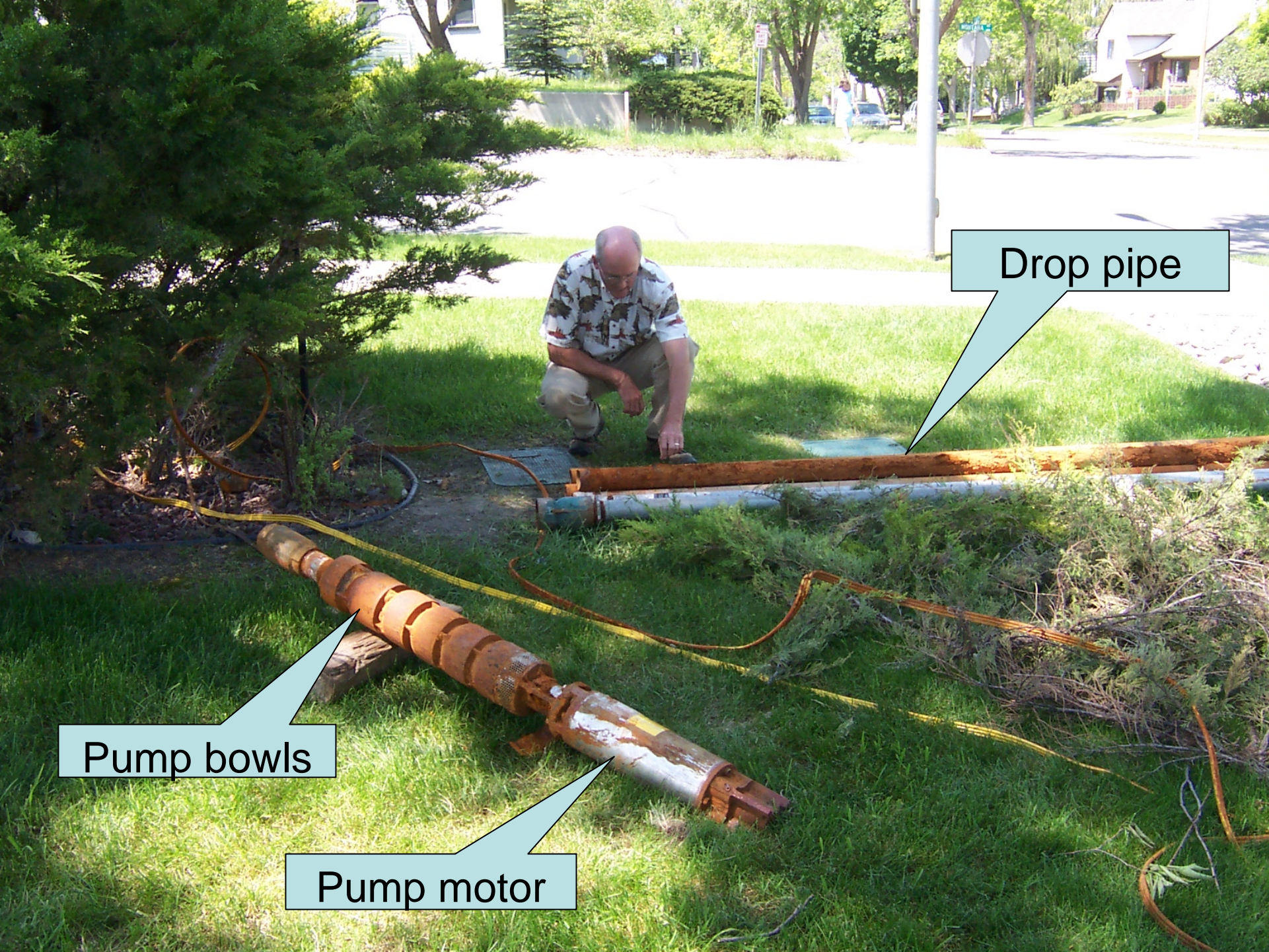


Well System Operation

- Pump run time > 1 minute
- Period between cycle > 3 minutes
- Checking for “waterlogged” tank
- Pressure ranges 20-40 or 30-50 psi are typical.

Let's look at the internal components of a well





Drop pipe

Pump bowls

Pump motor

Pump intake



ED J. J. J.
PUMPS
A. Marley Co. Inc.
SOUTH ANTON, MO
06-102
032131
16D 100

The image shows three pipes lying on a green lawn. Two of the pipes are heavily corroded, with a thick, orange-brown rust coating their entire surfaces. The third pipe, positioned slightly higher and to the right, is made of a different material, possibly aluminum, and remains shiny and free of rust. It has black tape wrapped around it with some white text, including '100 FT.' and '2 IN. x'.

Drop pipe



A pipe leak

Well drilling



New or Replacement Well:

- Hire a licensed driller.
- Get a copy of your well log.
- File a notice of appropriation.

The Well Log

- Location
- Construction detail
 - gallons per minute
 - static water level
 - Geologic formations (lithology)

One Page Site Report - GWIC Page 1 of 2

Surface Records of Mines and Geology
Ground Water Information Center Site Report

Plot this site on a topographic map

Location Information

WELL ID: 91470
Location (TNS): 014 002 14 00
County (MT): GALLATIN
DNRC Water Right: 00000
PWS ID:
Bore:
Lat: 45
Address: 0000 FLAND HOUSE

Source of Data: WIC
Latitude (45): 45.7000
Longitude (100): 111.0000
Elevation: 750 Feet
Datum: NAD83
Borehole (Shft):
Formulate of Survey:
Type of Site: WEL

Well Construction and Performance Data

Total Depth (FT): 200.00
Static Water Level (FT): 140.00
Pumping Water Level (FT): 170.00
Yield (gpm): 25.00
Test Type: GALLEN
Test Duration: 1.00
Drill Water Setting (FT):
Recovery Water Level (FT):
Recovery Time (hrs):
Well Status:

How Drilled: CABLE
Driller's Name: WIC 00000
Driller License: WWC000
Completion Date (MM/DD): 10/22/1999
Special Conditions:
Is Well Flowing?:
Shut-In Pressure:
Geology/Lithology: Not Reported
Well/Screen Use: DOMESTIC

Well Diameter Information

No Well Diameter Records currently in GWIC.

Annular Seal Information

No Seal Records currently in GWIC.

Lithology Information

From	To	Description
0.0	0.5	CLAY
0.5	4.7	CLAY/SHALE (SAND)
4.7	10.0	MUDSTAY CLAY & GRAVEL
10.0	11.0	CLAY/SHALE (SAND)
11.0	12.0	MUDSTAY CLAY
12.0	13.0	CLAY/SHALE (SAND)
13.0	14.0	CLAY/SHALE
14.0	15.0	SOFT CLAY
15.0	16.0	CLAY/SHALE
16.0	17.0	CLAY/SHALE
17.0	18.0	CLAY/SHALE
18.0	19.0	CLAY/SHALE
19.0	20.0	CLAY/SHALE

http://uhhgwic.mtech.edu/data/print.asp?gwic_id=91470&agency=mtbmg&version=... 10/25/2004

Log is filed with GWIC (Ground Water Information Center-MBMG) and DNRC

- By the driller
- A copy of the well log should be provided to the homeowner.

MONTANA WELL LOG REPORT

Other Options

[Plot this site on a topographic map](#)
[View scanned document \(11/3/2006 12:45:18 PM\)](#)Site Name: STATE CAPITOL WELL
GWC Id: 88689

Section 1: Well Owner

Owner Name

STATE OF MT C/O DEPT FISH WLDLF PKS

Mailing Address

1420 E 6TH AVE

City

HELENA

State

MT

Zip Code

59601

Section 2: Location

Township	Range	Section	Quarter Sections
10N	03W	32	SW¼ NW¼ SW¼ NW¼ NW¼ NW¼
County			
LEWIS AND CLARK			
Latitude	Longitude	Geomethod	Datum
46.5861	112.0191	UNKNOWN	NAD27
Altitude	Method	Datum	Date
4125			
Addition	Block	Lot	

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46.5861	112.0191	UNKNOWN	NAD27
Altitude	Method	Datum	Date
4125			
Addition	Block	Lot	

Section 3: Proposed Use of Water

IRRIGATION (1)

Section 4: Type of Work

Drilling Method: AIR ROTARY

Section 5: Well Completion Date

Date well completed: Wednesday, May 29, 1991

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	215	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	18	8				STEEL
18	215	6				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
90	110	6			SCREEN-CONTINUOUS-STAINLESS
155	185	6			SCREEN-CONTINUOUS-STAINLESS

Annular Space (Seal/Grout/Packer)

There are no annular space records assigned to this well.

Section 7: Well Test Data

Total Depth: 215

Static Water Level: 90

Air Test *

70 gpm with drill stem set at _ feet for _ hours.

Time of recovery _ hours.

Pumping water level _ feet.

Section 8: Remarks

Section 9: Well Log

Geologic Source

Unassigned

From	To	Description
0	6	SOIL CLAYEY MOIST
6	10	BEDROCK(HELENA DOLOMITE)-WEATHERED BUFF ORANGE LIME-RICH
10	112	DOLOMITE-SLIGHTLY WEATHERED WEATHERED SURFACES WHITE TO GRAY WHITE LIME-RICH FRESH SURFACES MEDIUM GRAY. 90'-110'=40 gpm
112	117	SHALY DOLOMITE-CHIPS SMALLER BUT STILL BEAR ABUNDANT LIMONITE STAINING(ABOUT 10% OF SURFACES STAINED):SMALL VEINS OF CaCO3 STILL OCCUR ON THE SURFACE OF LARGER CHIPS
117	212	DOLOMITIC SHALE-MED GRAY TO GRAY GREEN,CHIPS SMALLER MORE EQUI-DIMENSIONALDRILLING RATE DECREASING IN LOWER PART OF INTERVAL. 192'-197'=80 gpm
212	215	DOLOMITE SHALE-MED GRAY TO GRAY GREEN MUCH LIMONITE STAINING;CHIP SIZE LARGER,WELL PRODUCES ABOUT 5 GALLONS IN 2.5 SECONDS = ABOUT 120 GPM

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards.
This report is true to the best of my knowledge.**Name:**TERRY LINDSAY
Company:LINDSAY
License No:
Date Completed:5/29/1991

Example Well Log

How to find your Well Log

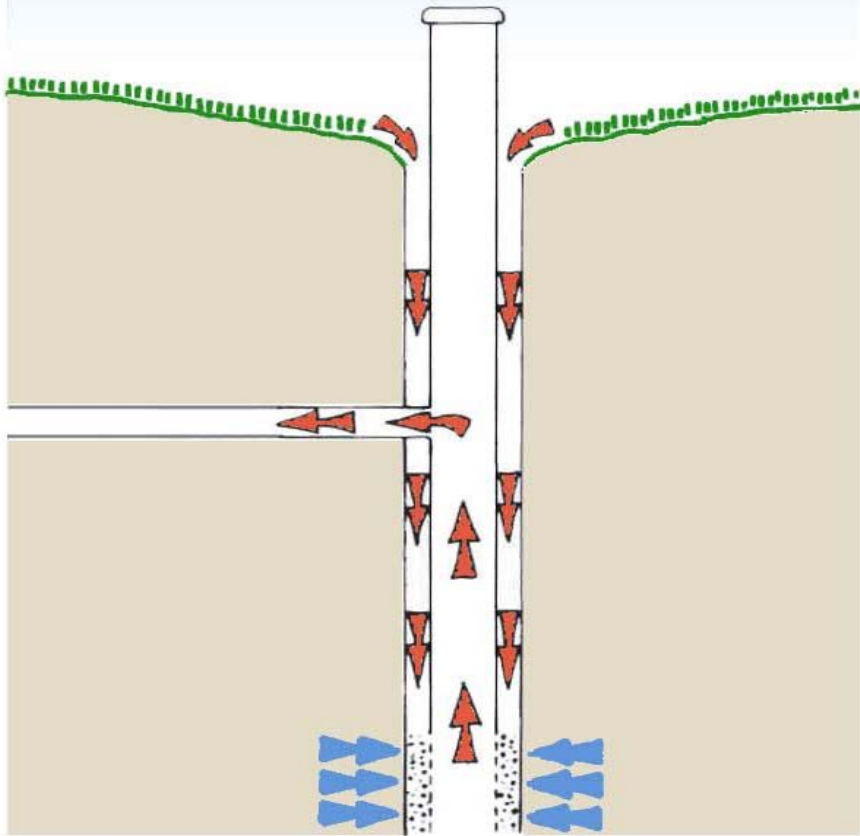
- Go on-line to <http://mbmggwic.mtech.edu/> .
- Contact local DNRC office
- Contact Joe Meek at DEQ at (406) 444-4806

Note: identifying your well log can be a challenge; have as much information available as possible such as:

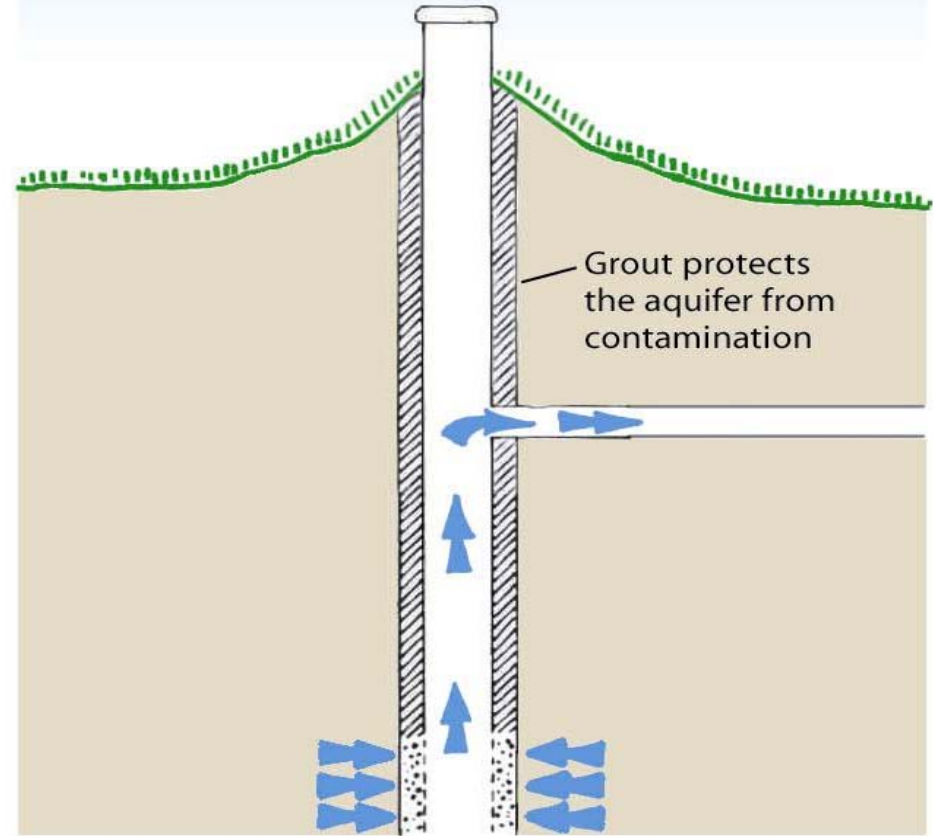
- original owner name & well location
- approximate date completed
- approximate depth

Construction:

**POORLY
PROTECTED WELL**



**PROPERLY
PROTECTED WELL**



Uncontaminated water ➡

Contaminated water ➡

Ground Water Pollution Sources



Wells, 100-foot protection zones, and septic system drainfields are too close in some of our older areas





Run-off into ground water

Break-down of wastes can leach to ground water. Diffuse sources are called “non-point pollution”



Manure should be managed to prevent heavy build up





Contaminated
leachate from
manure in corral will
recharge ground
water.



Manure dumped into
coulee is not good
waste management



Manure dumped into
coulee is not good
waste management



Is this recharging your aquifer





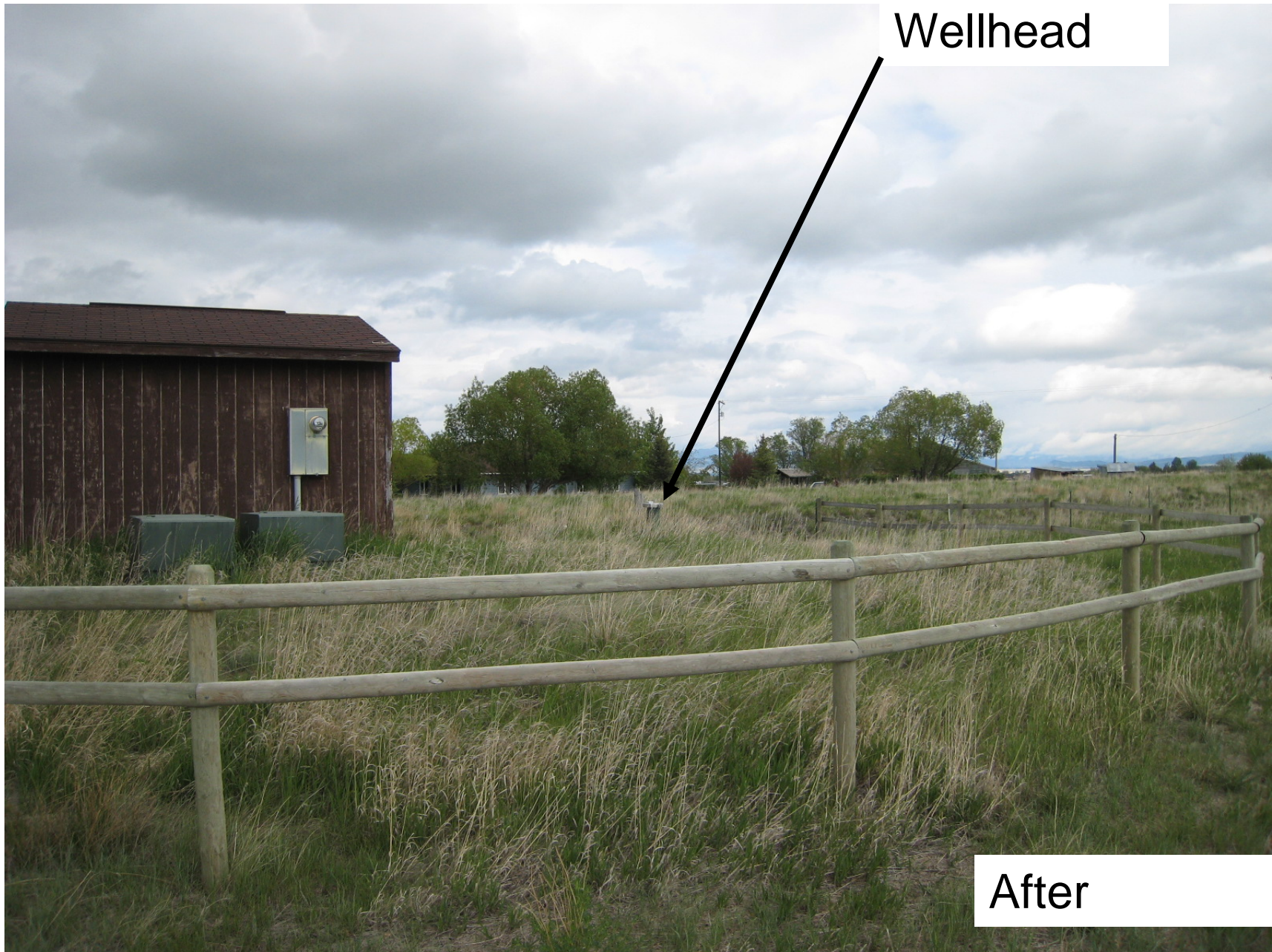
Keep livestock
away from wells

Well head



Before

Wellhead



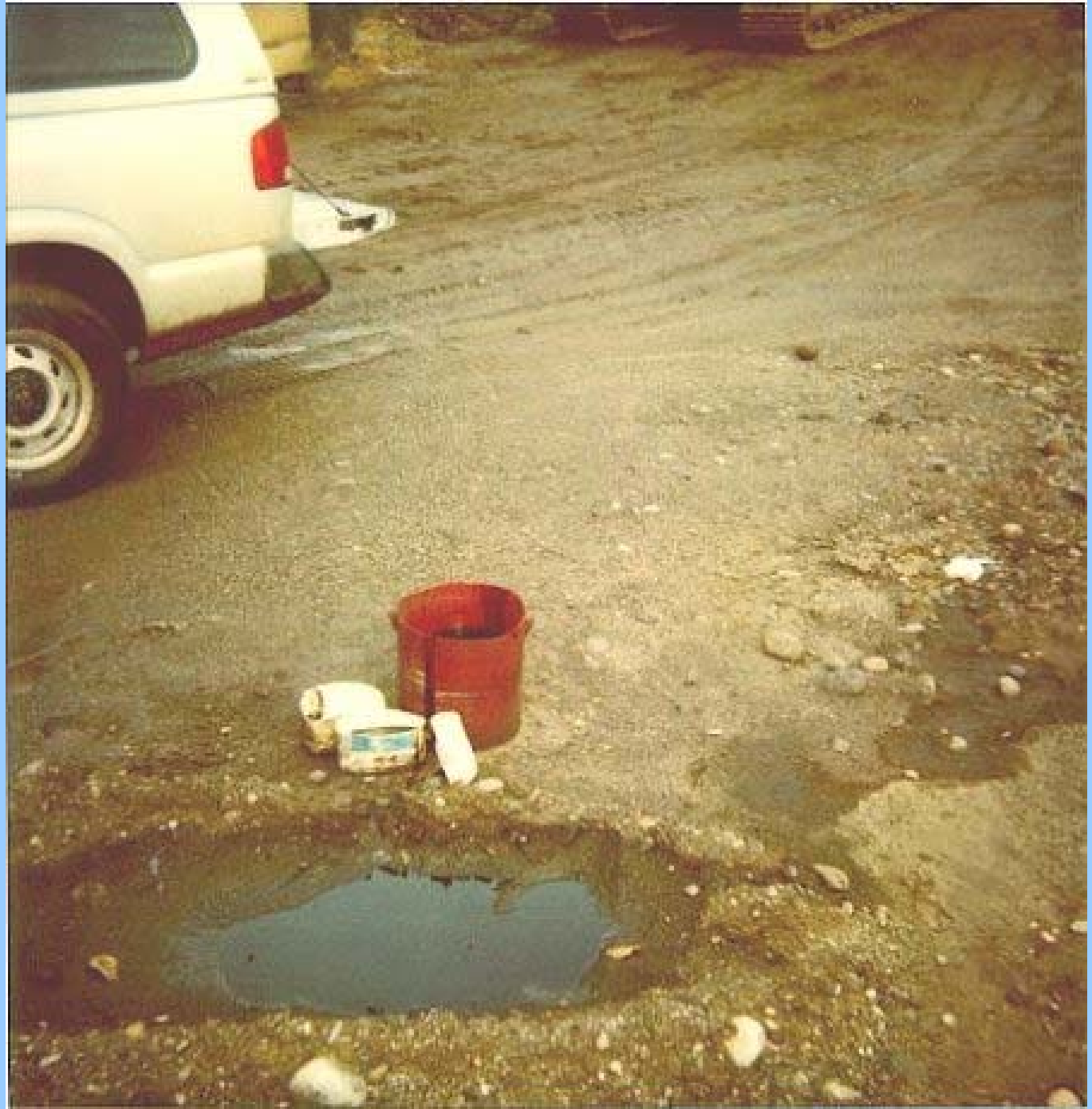
After

Composting manure for use as garden fertilizer



Don't dump
waste onto
ground.

Waste motor
oil can be
recycled!



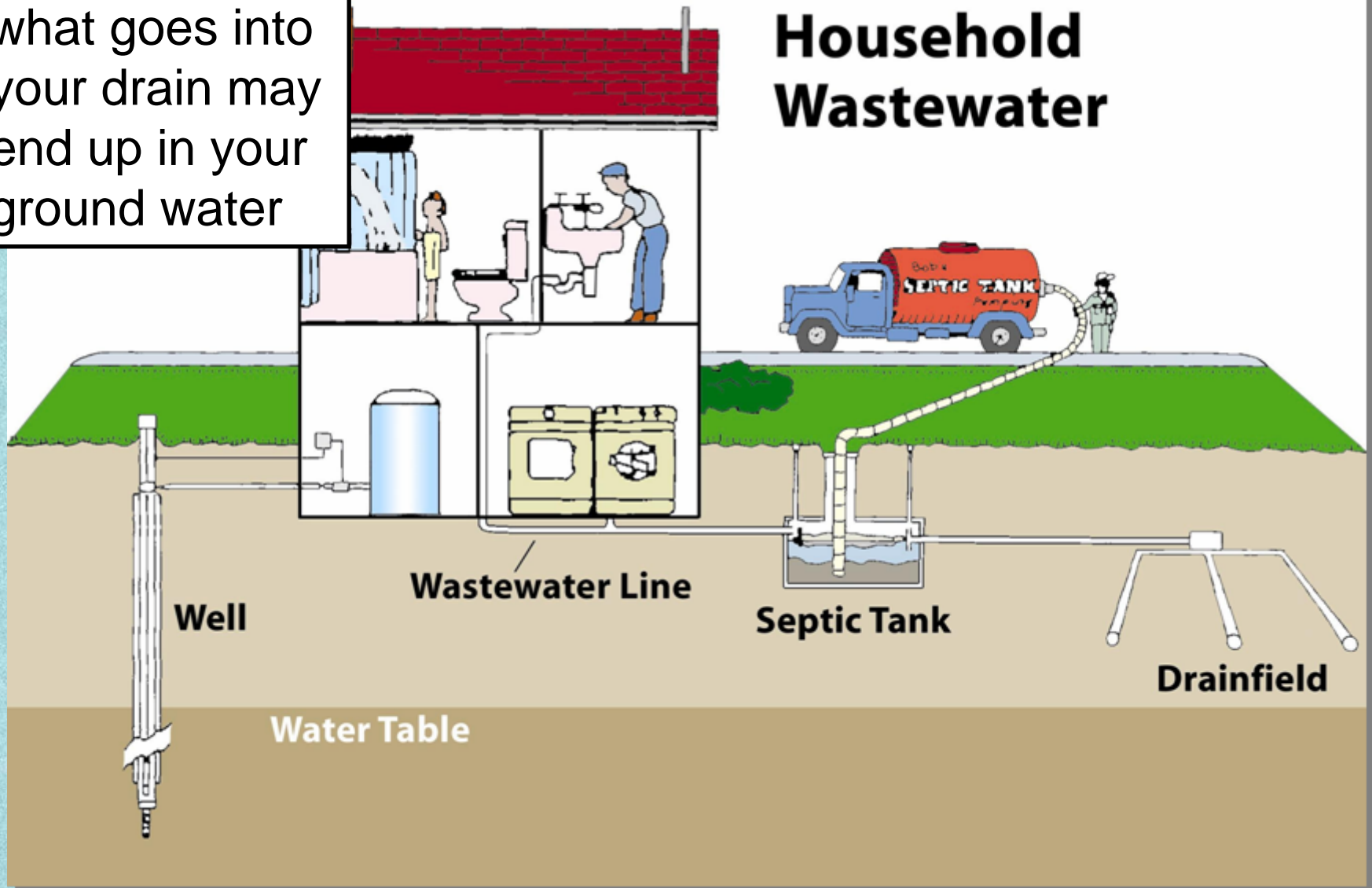
Household Hazards

- Cleaning products
- Automotive products
- Chemicals & fertilizers
- Unused prescription and medications



Remember,
what goes into
your drain may
end up in your
ground water

Household Wastewater





Who Protects My Drinking Water?

- YOU...are responsible for the safety of your drinking water.
- Be aware of area conditions



A vertical blue graphic on the left side of the slide showing water splashing into a glass, with bubbles and droplets visible.

Water Quality

Common Drinking Water Contaminants

- Biological
- Chemical
- Physical

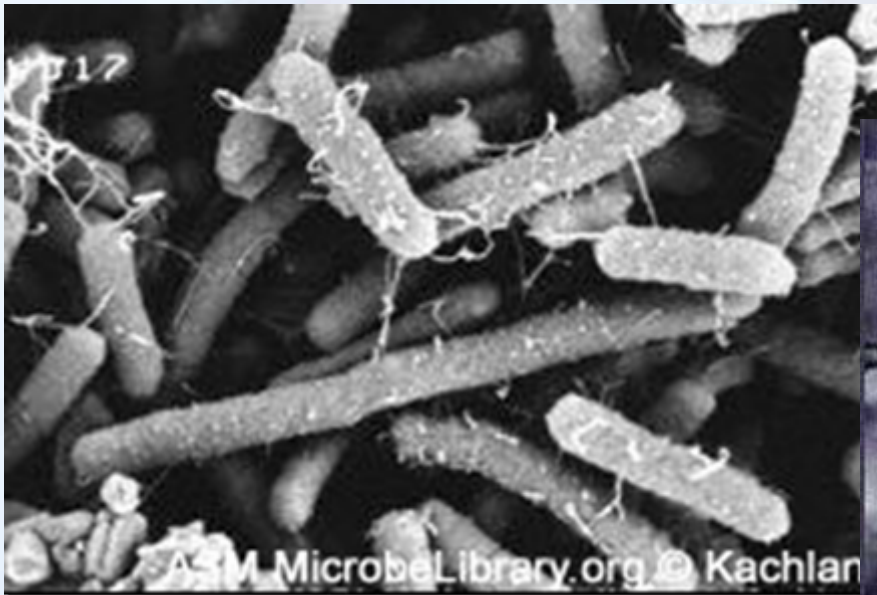


Pathogenic Microorganisms

Fecal coliform bacteria (*E. coli*)

Giardia

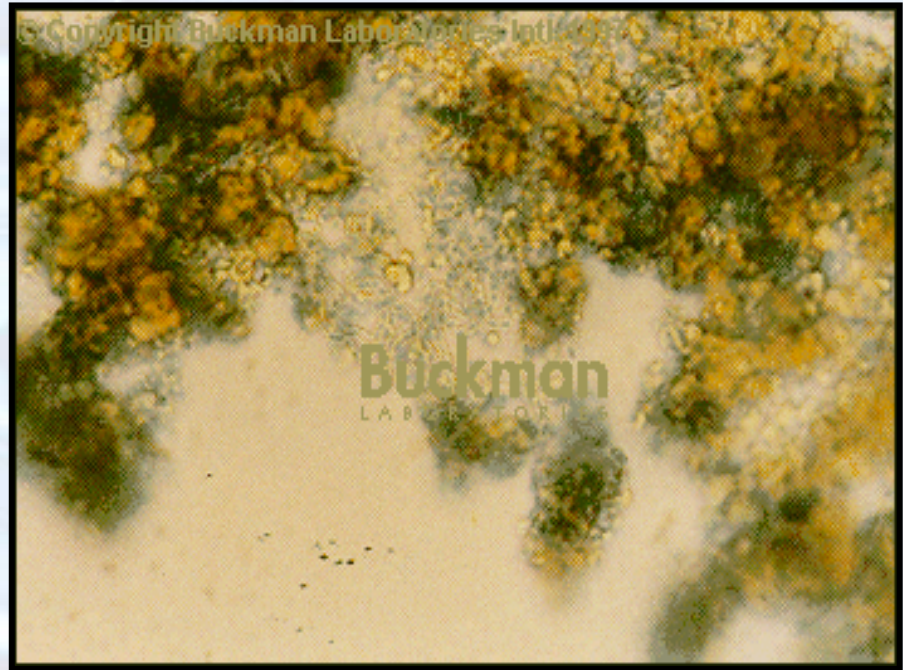
Viruses (Norovirus)



Nuisance Bacteria

Iron bacteria

- iron deposition
- slime in fixtures
- biofilm in plumbing





☐ Chemical Contaminants

- Petroleum products
- Nitrogen (nitrates)
- Metals
 - Arsenic
- PPCP

☐ Physical Characteristics

- Turbidity
- Taste
- Sediment
- Odor
- Color



Water Testing

Once a Year Test For

- coliform bacteria
- nitrate and pH (acidity)
- if pH is less than 7.0, test for lead.

Or at change in taste, odor, or appearance





If you have never had your water tested, or if you don't have any record of previous tests, test the for the following:

- **Coliform Bacteria**
- **Nitrate/nitrite**
- **pH (acidity)**
- **Chloride**
- **Iron**
- Sulfate**
- Hardness**
- Alkalinity**
- Total Dissolved Solids**
- Manganese**

Bedrock well

- **add Arsenic, Radon, Fluoride**



Where Can I Have My Water Tested?

- Some local labs:
 - Energy Laboratories-Billings
 - State Laboratory in Helena



Poor sampling technique is worse than not sampling



What Do the Results Mean?

- Compare to standards
- If high, DO NOT DRINK THE WATER!
- Watch trends
- Treatment or new source may be option



Water Treatment

Typical home treatment systems



Sediment filter



Sediment filter and softener



Iron Filter or Greensand Treatment Unit.

**Filter for iron,
manganese, and/or
sulfur odor treatment**



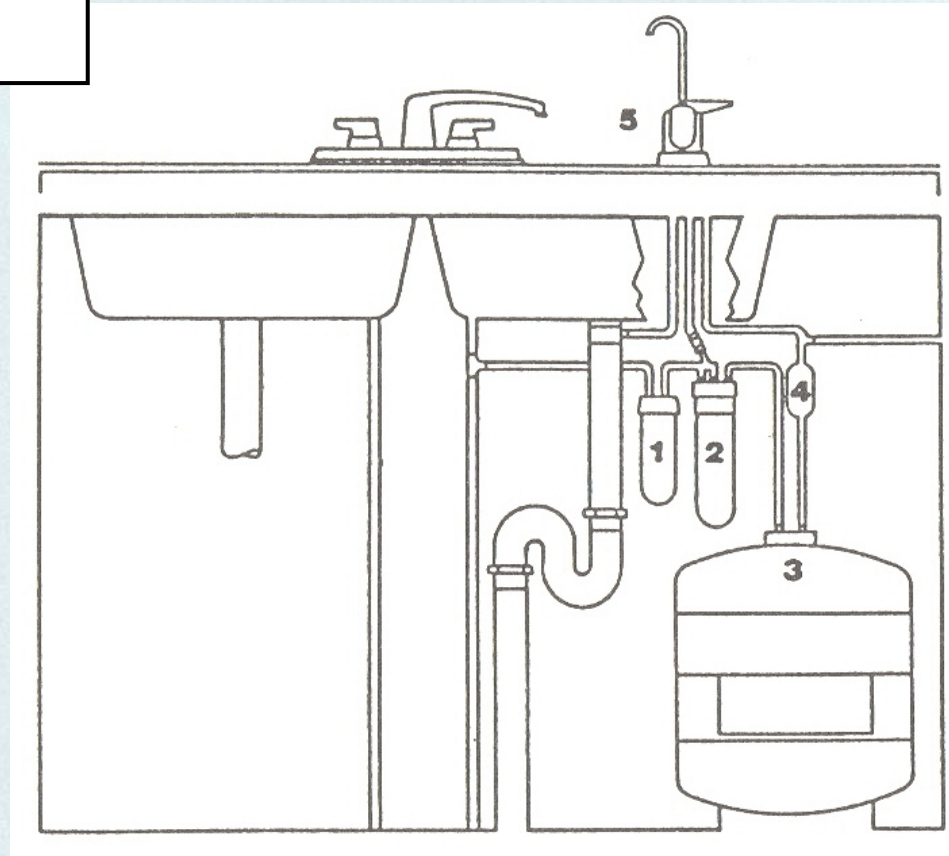
Under sink
treatment
system

Treated Water
Tank

Sediment filters, reverse osmosis membrane,
and charcoal filter.



Under sink
treatment
system
schematic





Top 10 Well Maintenance Tips

1. Regularly test your water...coliform & nitrate
2. Keep household hazardous materials away from your well.
 - Never dump down drain or on your property
3. Limit use of lawn & garden chemicals
 - Apply sparingly & follow application instructions

Tips!!

4. Take care in working around your well to prevent damage to the well casing.

- Don't pile snow, leaves, or other materials around your well.

5. Keep your well records in a safe place

- **Well log.....find it if you don't have it**



6. Periodically inspect well parts for damage:

- Broken or missing cap



- **Wire insulation has failed**



Be careful working at your wellhead!

- **Cracked, corroded or damaged casing**



- Watch for settling and cracking of ground surface around casing.



**Replace non-sanitary
well cap...**

Non-sanitary cap



**...with one that has a
sanitary seal.**

Sanitary seal cap



7. When landscaping...

**Avoid planting
flowers at wellhead
since they will
require watering and
need to be fertilized.**



7. When landscaping...

**Slope ground away
from casing
for proper drainage.**



8. Make sure top of well casing is at least 18" above ground surface.





- 9. Install backflow protectors on all outdoor faucets**
- 10. Hire a certified well driller for any new well construction, modification or abandonment and closure.**

Tips!!

For Additional Information:

Joe Meek MT DEQ (406) 444-6697

